STRUČNI RAD

Hrvat. Športskomed. Vjesn. 2017; 32:72-75

PHYSICAL ACTIVITY AND POST-STROKE DEPRESSION

TJELESNA AKTIVNOSTI I DEPRESIJA NAKON MOŽDANOG UDARA

Iris Zavoreo[1], Tatjana Trošt Bobić[2], Dubravka Ciliga[2], Vanja Bašić Kes[1]

[1]University Department of Neurology, Sestre milosrdnice University Hospital Center, Zagreb, Croatia
[2]University of Zagreb, Faculty of Kinesiology, Croatia

SUMMARY

Stroke is the third most frequent cause of death in developed countries worldwide and the most frequent cause of permanent disability. Post-stroke depression (PSD) is one of the most frequent complications of stroke. Most of the symptoms of PSD occur in in first two months, while minority of patients experiences their first symptoms 12 months after their stroke. Major depression and minor depression are the most frequently recognized expressions of PSD. In treatment of poststroke depression, multidisciplinary approach is of great importance leading to early diagnosis and treatment of stroke according to national recommendations, as well as early neurorehabilitation. In order to evaluate PSD, as well as functional deficit and level of physical activity, we should use international, standardized questionnaires. The promotion of physical activity as a part of healthy life style has become one of very important issue in health policy in many countries. A physically active lifestyle as we previously reported is important in primary stroke prevention, but also in stroke survivors in order to improve level of everyday activities and in secondary prevention of stroke.

Key words: stroke, poststroke depression, physical activity

SAŽETAK

Moždani udar je treći najčešći uzrok smrtnosti u razvijenim zemljama svijeta, a najčešći uzrok trajnog invaliditeta. Depresija nakon moždanog udara jedna je od najčešćih komplikacija moždanog udara. Većina simptoma depresije nakon moždanog udara, javlja se u prva 2 mjeseca, dok se u manjem broju bolesnika prvi simptomi mogu javiti i nakon godinu dana od moždanog udara. Najčešći klinički oblici depresije nakon moždanog udara su mala i velika depresivna epizoda. U liječenju depresije nakon možanog udara, od velike važnosti je multidisciplinarni pristup, njime će se postaviti rana dijagnoza moždanog udara i započeti neurorehabilitacija. U procjeni depresije nakon moždanog udara, kao i funkcionalnog deficita i razine tjelesne aktivnosti, potrebno je koristiti međunarodne, standardizirane upitnike. Promocija zdravog načina života postala je jedna od glavnih odrednica zdravstvene strategije u većini razvijenih zemalja. Životni stil koji podržava tjelesnu aktivnost važan je u primarnoj preenciji moždanog udara, ali i u bolesnika koji su preboljeli moždani udar, a u svrhu sekundarne prevencije moždanog udara.

Ključne riječi: moždani dar, depresija nakon moždanog udara, tjelesna aktivnost

Stroke is the third most frequent cause of death worldwide and the most frequent cause of permanent disability. Post-stroke depression (PSD) is one of the most frequent complications of stroke. Prevalence rates of PSD range from 30-50%. The occurrence of PSD peaks three to six months after stroke. Most of the symptoms of PSD occur in in first two months, while minority of patients experience their first symptoms 12 months after their stroke (1,2). Major depression and minor depression are the most frequently recognized expressions of PSD. The course of PSD can be rather lengthy, for example, symptoms of major depression identified in 27% of stroke patients persisted for approximately one year, while symptoms of minor depression in 20% of stroke patients lasted for more than two years. There is strong bidirectional interplay between PSD and stroke-there is a high prevalence of depression between stroke patients and there is a higher risk of stroke in depressed people (3.36 relative risk) even when other conventional stroke risk factors (hypertension, diabetes, hyperlipidemia, heart disease and tobacco use) are under control (2.67 relative risk) (3-5). There are significant negative consequences of PSD on the recovery of motor and cognitive deficits after stroke, as well as the mortality risks associated with stroke, but also different clinical manifestations of stroke result in different modalities of PSD. Functional and cognitive impairment, a greater dependency with regard to activities of daily living functions, speech anf language problems, apraxia and an overall lower quality of life after stroke are associated with increased incidence of poststroke depressive symptoms in the convalescent phase (5-7).

The most frequently used scale for evaluating depression in stroke patients is the Hamilton Depression Rating Scale (HDRS); in literature can be found also General Health Questionaire (GHQ), Hospital Anxiety and Depression Scale (HAD), Aphasic Depression Rating Scale (ADRS) or some modified scales such as the Lausanne Emotion in Acute Stroke Study (LEASS). In evaluation of neurological deficit, and functional state most frequently are used National Institute of Health Stroke Scale, (NIHSS), Rankin Scale and Barthel Index. For evaluation of cognitive functions most frequently are used Mini Mental State Exam (MMSE) and Montreal Cognitive Assessment (MoCA) (8,9).

In contrast to direct observations (accelerometers, pedometers, heart rate monitors, arm bends, etc), self-report diaries require participants to record physical activity (PA) in real time which provides the most detailed data and can overcome some limitations of questionnaires (i.e., less susceptible to recall errors, social desirability bias, measurement bias) (10-12).

In evaluation of physical activity, we should pay attention on four key features: quality of PA measured (type, intensity, frequency, duration), objectivity of the data, subject burden (time and/or effort required to complete), cost/burden to administer, and specific limitations, discussed above. In stroke patients is of great importance to take into consideration age, gender, body weight, co-morbid conditions, as well as residual neurologic deficit (Barthel indeks, modified Rankin scale) that may impact choosing a PA measure (13-15).

The clinical manifestations of PSD consist of mood abnormalities, neuropsychological disturbances with impairment of executive functions a greater tendency to psychomotor retardation, poor insight and impaired activities of daily living. Vegetative symptoms consisting of disturbances of sleep, libido and level of energy, were significantly more frequent among depressed than non-depressed stroke patients in first 24 months after stroke (16).

Location and size of the stroke, temporal relation between PSD and stroke, and the size of the ventricles are various risk factors associated with PSD. Patients with stroke in the territory of the anterior circulation (middle cerebral artery) have longer duration of PSD symptoms comparing patients with posterior circulation strokes. In patients who present depressive symptoms during first 10 days following the stroke, there is a higher frequency of left- hemisphere than right-hemisphere lesion (17-19). Overt sadness is more frequently associated with left (86%) than right lesions (61%, $p<0.05$). Crying is also more frequent in left versus right lesions (50% vrs 20%, $p=0.02$). When symptoms of depression appear more than one year after stroke right side lesions are more frequent. Stroke severity and disability may cause a reactive depressive process in early stages after stroke, but probably does not mediate the development of PSD in the long term. There is a significantly higher prevalence of PSD among patients with non-fluent aphasia, but not among patients with fluent aphasia. The presence of PSD has been found to have negative impact on recovery of cognitive function, recovery of ability to perform activities of daily living (ADL), mortality risks. Large prospective studies have reported poorer functional outcome at 15 months in patients with depression 3 months after stroke and a strong correlation of functional outcome and depressive symptoms at both 3 months and 1 year after stroke. Multivariate analysis has shown that male patients had 3 times higher probability than female patients of good autonomy in both stair climbing and activities of daily living (OR=3.32;95% CI, 1.67-6.18 and OR 2.92;95% CI, 1.63-5.42, respectively). Female had a higher risk of walking with a cane (OR=1.69;95%CI 1.04-2.76) or of partial autonomy with respect to activities of daily living (OR=1.90;95% CI 1.25-2.91). Differences in functional outcome might be due to different approaches to their disabilities, with women showing greater insecurity. Depression after stroke led to 3.4-fold increase in mortality up to 10 years after stroke. Meta analyses have shown no statistically significant correlation between age and PSD (13 of 17 studies). Complete recovery will make 60%, while 20% will make no recovery. When evaluating PSD in recurrent stroke patients, there must be information about previous stroke localization, clinical manifestations, disability-activities of daily living dependent, presence of PSD etc.

In treatment of poststroke depression, multidisciplinary approach is of great importance leading to early diagnosis and treatment of stroke according to national recommendations, as well as early neurorehabilitation. In cases of increased risk for PSD, treatment should be started as soon as possible. When planning PSD treatment we are aiming to achieve complete symptom remission of the depressive episode which may have a positive impact on recovery of neurological deficit. Several studies were evaluating efficacy of PSD pharmacotherapy (Tricyclic antidepressants TCAs and selective serotonin reuptake inhibitors-SSRIs). Sertraline has been shown effective in prevention of PSD during one year in a double blind study (incidence of PSD on sertraline 8,3% vrs placebo 22,8%; p=0.037). When comparing fluoxetine, nortriptyline or placebo for a three months period, patients on placebo were more likely to develop PSD than those treated with antidepressant drugs (0.036). Antidepressant drugs have multiple mechanisms of action. They are affecting neurotransmitter pathways, resulting in mood modification, but also they have positive impact on neural growth factor levels (especially brain derived neural growth factor-BDNF) which are of great importance for neuroplasticity, affecting neurorehabilitation and post stroke functional recovery (20-23).

There is also bidirectional interaction between physical activity and poststroke depression. Large clinical studies have shown reduced morbidity and mortality from cerebrovascular and cardiovascular incidence in people who are practicing regular physical activity. It is well known that patients suffering stroke have low levels of physical fitness and muscle strength that impact their ability to perform everyday activities and affect their independence and community participation. Physical inactivity after stroke has negative impact on potential neuroplasticity and recovery of motor and cognitive abilities (13-15). Therefore it is of great importance to introduce kinesitherapy in early post stroke neurorehabilitation. In order to promote, maintain health as well as to provide adequate kinesitherapy in stroke patients and prevent PSD (in correlation with functional outcome) we should practice some regular activities- moderate intensity aerobic activity, muscle-strenghtening activity and increase of endurance, weight regulation and energy balance estimation. In this activities should be engaged professionals usually in early rehabilitation in Stroke units with multidisciplinary approach (specialized units on Neurological Departments) as well as after discharge. In order to reduce excessive bed rest and physical and mental inactivity, at home in rehabilitation should be included family members, friends and coworkers in order to reduce family stress, increase social activities and enable return to normal everyday activities (24-27). After readapting to new conditions return to work should be observed and if it is needed professional counceling and new job. Early mobilization (in first 24-48 hours after stroke) should include helping patient to get out of bed into sitting, standing up and walking position. First results have shown positive impact of early mobilization on functional outcome. The recognition of neurological deficit and underlying neuromuscular processes is essential in planning task-specific raining and practice model of rehabilitation with emphasis on activating motor learning processes providing functional rehabilitation with combination of skill and aerobic training methods. In rehabilitation centers, patient should have individual training with therapist, but also should be included in groups, in circuit training where patients practice at work stations set up for weight bearing strength training exercises and to encourage practice and specific actions. Some centers are using different training machines-treadmills with harness suspension, stationary bicycles, electronically braked isokinetic ergometer, stepping machine, as well as technological aids such as robotic devices and virtual reality systems (27-29).

World Health Organisation (WHO) issued a warning that sedentary life style is one of the important risk factors for cerebrovascular and cardiovascular diseases. The promotion of physical activity as a part of healthy life style has become one of very important issue in health policy in many countries. A physically active lifestyle as we previously reported is also important in stroke survivors in order to improve everyday activities and in secondary prevention of stroke.

References

1. World Health Organization. Classification of dysthymia and related conditions in neurological disorders: recommendations for clinical descriptions and criteria for research. Geneva: World Health Organization, 1997.
2. Ebrahim S, Barer D, Nouri F. Affective illness after stroke. Br J Psychiatry 1987;151:52-6.
3. Cummings JL. Disturbances of mood and affect: cerebrovascular disorders. Neuropsychiatry and behavioral sciences. New York: Oxford University Press, 2003:206.
4. Hackett ML, Anderson CS. Frequency of depression after stroke. Stroke 2005;36:1330-40.
5. Robinson RG. Poststroke depression: prevalence, diagnosis, treatment and disease progression. Biol Psychiatry 2003;54:376-87.
6. House A, Dennis M, Mogridge L, Warlow C. Mood disorders in the year after first stroke. Br J Psychiatry 1991;158:83-92.
7. Berg A, Palomaki H, Lehtihalmes M. Poststroke depression – an 18 month follow up. Stroke 2003;34:138-43.
8. Duncan PW, Jorgensen HS, Wade DT. Outcome measures in acute stroke trials. Stroke 2000;31:1429-38.
9. Eriksson M, Asplund K, Glader EL. Self reported depression and use of antidepressants. Stroke 2004;35:936-41.
10. Macfarlane DJ, Lee CC, Ho EY, et al. Convergent validity of six methods to assess physical activity in daily life. J Appl Physiol. 2006;101(5):1328–34.
11. Craig CL, Marshall AL, Sjostrom M, et al. International physical activity questionnaire: 12-country reliability and validity. Med Sci Sports Exerc. 2003;35(8):1381–95.
12. Welk G. Introduction to physical activity research. In: Welk GJ, editor. Physical activity assessments for health-related research. Human Kinetics Publishers, Inc; Champaign: 2002: 4.
13. Melanson EL, Jr, Freedson PS. Physical activity assessment: a review of methods. Crit Rev Food Sci Nutr. 1996;36(5):385–96.
14. Westerterp KR. Assessment of physical activity: a critical appraisal. Eur J Appl Physiol. 2009;105(6):823–8.
15. Sylvia LG, Bernstein EE, Hubbard JL, Keating, L, Anderson EJ. A Practical Guide to Measuring Physical Activity. J Acad Nutr Diet. 2014; 114(2): 199–208.
16. Aaron SE, Gregory CM, and Simpson AN. Lower Odds of Poststroke Symptoms of Depression When Physical Activity Guidelines Met: National Health and Nutrition Examination Survey 2011–2012. J Phys Act Health. 2016; 13(8): 903–909.
17. Starkestein SE. Comparison of patients with and without post stroke major depression matched for age and location of lesion. Arch Gen Psychiatry 1988;45:247-52.
18. Robinson RG, Honig MA, Parikh RM, Joselyn P. Mood changes in stroke patients: relation to lesion location. Brain 1984;107:81-93.
19. Robinson RG. Mood changes following left hemisphere brain injury. Ann Neurol 1981;91:447-53.
20. Herrman M. Is there a pathoanatomic correlate for depression in the postacute stage of stroke? Stroke 1995;26:850-6.
21. Bogousslavsky J. Emotions, mood and behavior after stroke. Stroke 2003;34:1046-50.
22. Bhogal SK, Teasall R, Foley N. Lesion location and post-stroke depression. Stroke 2004;35:794-802.
23. Gainotti G, Antonucci G, Marra C. Relation between depression after stroke, antidepressant therapy and functional recovery. J Neurol Neurosurg Psychiatry 2001;71:258-61.
24. Toso V. The Italian multicenter observational study on PSD (DESTRO). J Neurol 2006;253:556-62.
25. Kotila M, Numminen H, Waltimo O, Kaste M. Depression after stroke. Results of the FINNSTROKE study. Stroke 1998;29:368-72.
26. Williams LS. Care and management of PSD. Stroke 2007;38:998-1003.
27. Gabaldon L, Fuentes B, Frank A. Poststroke depression-importance of detection and treatment. Cerebrovasc Dis 2007;24:181-8.
28. Hong I, Aaron SE, Li CY, Simpson AN. Physical Activity and the Risk of Depression in Community-Dwelling Korean Adults With a History of Stroke. Phys Ther. 2017; 97(1):105-113.
29. Thilarajah S, Mentiplay BF, Bower KJ, Tan D et al. Factors associated with post-stroke physical activity: a systematic review and meta-analysis. Arch Phys Med Rehabil. 2017;(17)31264-9.